

Claims

Sub A17

1. A method of mapping a topology of the spare capacity of a distributed restoration algorithm (DRA) provisioned telecommunications network having a plurality of nodes interconnected with working and spare links, comprising the steps of:

a) outputting a message from each spare link of each of said nodes to the adjacent node to which said each spare link is connected;

b) identifying the port number of said each node from where said each spare link outputs said message and the port number of the adjacent node connected to said each spare link whereat said message is received;

c) storing as data the respective port numbers of all nodes that have connected thereto at least one spare link via which said message is either sent or received, the identifies of said all nodes and the spare links interconnecting said all nodes; and

d) generating from said stored data the topology of all spare links interconnecting the nodes of said network.

2. The method of claim 1, further comprising the steps of;

storing said data in a central processing means; and

providing said generated topology of the spare links of said network to the origin node for

beginning the restoration process if a failure occurs
in said network.

3. The method of claim 1, wherein when a failure
occurs in said network, further comprising the step of:
transmitting from each of the custodial nodes
of the failed link a message, via any functional spare
links that it has, to nodes downstream thereof to
inform said downstream nodes that it is a custodial
node.

4. The method of claim 1, further comprising the
steps of:
selecting one of the custodial nodes of a
failed link to be the origin node; and
said origin node utilizing said topology of
the spare capacity of said network to find an alternate
route to reroute the disrupted traffic.

5. The method of claim 2, further comprising the
steps of:

continuously updating the status of said
message arriving at each spare port of the nodes of
said network; and

storing said updated status in said central
processing means;

wherein said central processing means is
adaptable to use said updated status to provide a real
time topology of the spare capacity of said network.

5 Ba Cont. 6. In a distributed restoration algorithm (DRA) provisioned telecommunications network having a plurality of nodes interconnected with working and spare links, a method of continuously monitoring the available spare capacity of said network, comprising the steps of:

- 10 a) generating keep alive messages;
b) continuously exchanging said keep alive messages on the spare links of said network when a DRA event is not in progress; and
c) recording the various spare ports that transmitted and received said keep alive messages to determine the number of spare links available in said network.
15

7. The method of claim 6, wherein said step c further comprises the step of:

20 generating each of said keep alive messages to include

a first field containing the identification number of the node that sent said message;

25 a second field containing the identification number of the port of said node whence said message is output;

a third field having an identifier that is set to a specific value when said node is one of the custodial nodes that bracket a failed link.

Sub
B3.

8. The method of claim 7, further comprising the step of:

generating each of said keep alive messages
5 to include a fourth field
identifying said keep alive message to be a message
that is continuously transmitted and exchanged along
spare links between adjacent nodes of said network
while a DRA process is not in progress.

10

9. In a distributed restoration algorithm (DRA)
provisioned telecommunications network having a
plurality of nodes interconnected with working and
spare links, a message being transmitted between
15 adjacent nodes of said network that are connected by at
least one spare link for mapping the topology of the
spare capacity of said network, comprising:

a first field containing the identification
number of the node that sent said message;

20

a second field containing the identification
number of the port of said node whence said message is
output; and

25

a third field having an identifier that is
set to a specific value when said node is one of the
custodial nodes that bracket a failed link;

wherein, when there is a failed link, said
message is broadcast from one of the custodial nodes
that bracket said failed link.

